

May/Jun 2025
HOMEMYEXM

BMI2601

Clinical Biochemistry II

**100 Marks
4 Hours**

First Examiner: Mr C Twala

Second Examiner: Dr MH Mkhombo

This paper consists of Four (4) pages.

Instructions:

- This is a timed **take-home examination**.
- You will require a PC, laptop, or tablet. Smartphones can be used to photograph hand-written pages and collate into a file for upload and as Wi-Fi hotspots for connectivity.
- You have **4 hours** to answer all the required questions. You will be given an **additional 15 minutes to download the question paper** and **30 minutes to upload the answer file**. Submissions made after the official examination time will be rejected by the examination regulations and will not be marked.
- Clearly indicate your student number and all required information on the front page of your answer sheet.
- Read each question carefully before you answer and take note of the mark allocation per question to determine how comprehensive your answer should be.
- If handwritten, make sure your writing is neat and easy to read.
- Students must upload their answer scripts in a **single PDF file** (answer scripts must not be password protected or uploaded as “read only” files). **No emailed scripts will be accepted**. Please utilise the contingency link provided by your module lecturer should you be unable to submit on the myExams platform
- Students are advised to preview submissions (answer scripts) to ensure legibility and that the correct answer script file has been uploaded.
- Incorrect file format and uncollated answer scripts will not be considered. Incorrect answer scripts and/or submissions made on unofficial examinations platforms (including the invigilator cell phone application) will not be marked and no opportunity will be granted for resubmission.
- A mark awarded for an incomplete submission or for an illegible scanned submission will be the student's final mark. No opportunity for resubmission will be granted. Only the last file uploaded and submitted will be marked. Submissions will only be accepted from registered student accounts.
- Students who have not utilised invigilation or proctoring tools will be deemed to have transgressed Unisa's examination rules and will have their marks withheld. Students have 48 hours from the day of their examination to upload their invigilator results from the Invigilator App. Failure to do so will result in students deemed not have utilised invigilation or proctoring tools.
- Students must complete the online declaration of own work when submitting. **Students suspected of dishonest conduct during the examinations will be subjected to disciplinary processes**. Students may not communicate with other students, or request assistance from other students during examinations. Plagiarism is a violation of academic integrity and students who plagiarise, copy from published work or Artificial Intelligence Software (e.g., ChatGPT) or online sources (e.g., course material), will be in violation of the Policy on Academic Integrity and the Student Disciplinary Code and may be referred to a disciplinary hearing. Unisa has a zero tolerance for plagiarism and/or any other forms of academic dishonesty.
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- Students experiencing the above challenges are advised to apply for an aegrotat and submit supporting evidence within ten days of the examination session.
- Students experiencing technical challenges should contact the SCSC on 080 000 1870 or via e-mail Examenquiries@unisa.ac.za or refer to the [Get- Help](#) resource for the list of additional contact numbers. Only communication received from your myLife account will be considered.

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- Ensure you are connected to the internet to log into the Invigilator App and scan the QR code below.
- If you encounter difficulty in scanning the QR code, you can alternatively enter the Exam Access Code below the QR code to start the invigilation.
- Unless otherwise specified by your institution, note that you can only scan this QR code once. If your assessment has multiple online sections, tests or attempts, you should NOT finish the invigilation until your entire assessment has been completed.
- Only scan the QR code when the assessment formally commences.
- The QR code is only scannable for a limited time, and it should therefore be scanned as soon as possible to start the invigilation.
- Once the QR code is scanned, ensure your media volume is turned up and place your smartphone next to you. The Invigilator App will notify you with a notification beep when you are required to action a request, which you should then perform.
- We recommend that you keep your smartphone on charge for the duration of the assessment.
- If you only have one device you may access your assessment in the application by pressing the 'Access Exam' button in the top right corner of your app.
- Keep the Invigilator App open on your cell phone for the full duration of the assessment. You are not allowed to minimise or leave the app.
- Ensure you are connected to the internet in order to commence the invigilation as well as at the end of the assessment. No internet connection is required during the assessment.
- You must adhere to the assessment time limit communicated to you by your institution as the time displayed in the Invigilator App could differ from the time allocated to complete your assessment.
- You can click the "Finish Assessment" button in the app if you finish your assessment early.
- If you are performing a written or Scan-and-Upload assessment:
- The Invigilator App may request you to take a picture of every page of your answer sheet at the end of the assessment. Unless otherwise specified by your institution, this does NOT replace the normal upload of your script to your institution's online portal.
- After completing invigilation and following all app instructions, you must upload your Invigilation App data. If however there is a delay in the upload of the app data at the end of the assessment, you should prioritise the upload of your script to your university portal and you can temporarily minimise the app to do so. Uploading of app data is not time sensitive and you can come back and do it after you have successfully uploaded your script to the exam portal.
- Should you encounter any difficulties, please WhatsApp The Invigilator Helpdesk on 073 505 8273.



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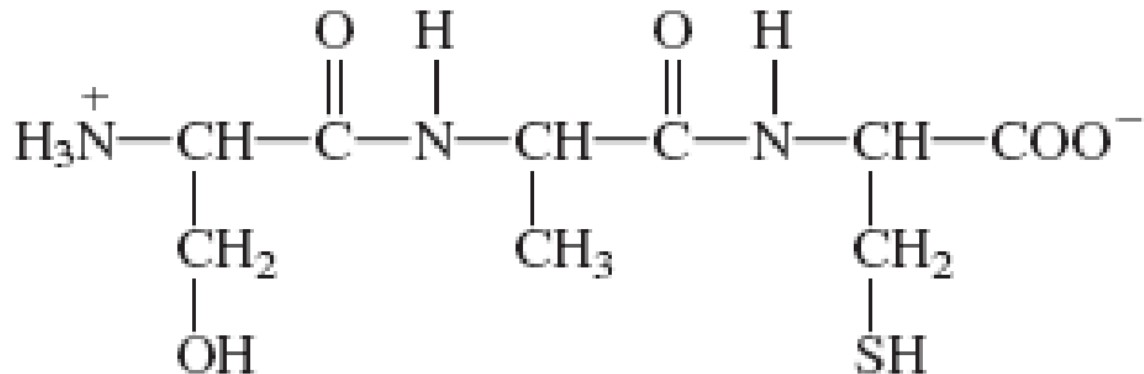
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- Access myExams at <https://myexams.ac.za/portal> and login using your student number and password.
- Go to your specific examination site through the site tabs on the horizontal navigation bar. Also check your sites link in the top right-hand corner if you do not find the site on the horizontal navigation bar.
- Once the site has loaded, select the eAssessment tool from the left-navigation menu. The list of all available assessments in the site will be displayed.
- Select the assessment for which you want to download/upload the examination answer file by clicking on the title of the assessment in the list. A new page will open.
- Submit your examination answer file (PDF).

QUESTION 1

[20]

- 1.1. Briefly describe the FOUR (4) different types of noncovalent bonds. (4)
- 1.2. Describe the distinguishing features of the N-terminus and C-terminus of a protein. (6)
- 1.3. Give the full name, 1-letter and the 3-letter abbreviations of the following peptide. Indicate the amino acid on the N- and the C-terminus of the structure. (10)



QUESTION 2

[20]

2.1. You are working in a biomedical research laboratory analysing protein expression in malaria-infected red blood cells. As part of your workflow, you are required to separate and visualize proteins extracted from both infected and uninfected cells to identify changes in protein profiles.

Explain the principles underlying SDS-PAGE and describe how this technique enables the separation of proteins in the scenario above. (10)

2.2. List and briefly describe three distinct protein sequencing techniques or platforms commonly used in proteomics and further discuss how these techniques contribute to protein identification and characterization. (10)

QUESTION 3

[20]

You are part of a molecular diagnostics team investigating a genetic mutation suspected of causing a rare hereditary blood disorder. To understand how the mutation affects the patient's phenotype, you must trace how genetic information stored in DNA is ultimately expressed as a protein.

Explain how genetic information is expressed as proteins. In your answer, discuss the key molecular processes of DNA replication, transcription, and translation, highlighting how each contributes to accurate protein synthesis. (20)

QUESTION 4

[20]

4.1. Using the classification system developed by the International Union of Biochemistry and Molecular Biology (IUBMB) classification system, classify enzymes into their major classes. For each class, briefly describe the type of reaction catalysed. (10)

4.2. Explain the significance of studying the enzyme structure and function. (10)

QUESTION 5

[20]

5.1. Fasting induces significant metabolic adaptations to maintain energy balance in the body.

Describe the changes that occur in the levels of plasma insulin, plasma glucagon, plasma free fatty acids, blood glucose, liver glycogen, and blood ketone bodies when the body is in the fasting state. (10)

5.2. Describe the importance of dietary sugars and lipids. In your answer, discuss in detail the impact of the storage of these molecules in the human body. (10)

TOTAL: 100 MARKS